

We claim:

1. A method for determining if an update to an XML document can be reflected in an underlying relational database, wherein said XML document is comprised of a tree of nodes, said method comprising the steps of:
 - 5 assigning at least one of a plurality of categories to each of said nodes, wherein said plurality of categories are based on a cardinality relationship indicated by one or more correlation predicates and one or more foreign key constraints in said underlying relational database; and
 - 10 determining whether said update to said XML document can be reflected in said underlying relational database based on said assigning category.
2. The method of claim 1, wherein said plurality of categories includes overlap island, dependency continent and referenced peninsula categories.
- 15 3. The method of claim 1, wherein said plurality of categories includes transitive archipelago and pseudo transitive archipelago categories.
4. The method of claim 1, further comprising the step of determining an update execution strategy based on said assigning category.
- 20 5. The method of claim 4, wherein said update is a deletion of a branch dependency continent (DC) node and wherein said update execution strategy comprises the steps of:
 - 25 deleting the corresponding tuple in an element base view; and
 - propagating the deletion recursively to all branch dependency continent-children of the deleted node.
6. The method of claim 4, wherein said update is an insertion of a branch dependency continent node that is permitted only if overlap island-descendants of the inserted node, as given in the insertion, include exactly those descendant nodes that can be derived from existing tuples in the database that satisfy the correlation predicates and each
- 30

branch node in the inserted subtree has a leaf child corresponding to the key of the element base view; and wherein said update execution strategy comprises the steps of:

inserting said corresponding tuple, with the foreign-key values equal to the key values of its direct parent, into the element base view;

5 propagating the insertion recursively to all branch dependency continent-children of the inserted node; and

propagating the insertion to its branch referenced peninsula-descendants that contain new values.

10 7. The method of claim 4, wherein said update is a movement of a branch dependency continent node that is permitted only when a foreign key in the node to be moved does not itself appear in the view as a leaf node and wherein said update execution strategy comprises the step of setting foreign-key values in an element base view of the DC-node to the key values of its new direct parent:

15 8. The method of claim 4, wherein said update is a deletion of a leaf DC-node that is permitted only when the node does not correspond to a foreign key appearing in correlation predicates and wherein said update execution strategy comprises the step of setting a corresponding attribute in the element base view to NULL.

20 9. The method of claim 4, wherein said update is an insertion of a leaf DC-node that is permitted only when the leaf node does not correspond to a foreign key appearing in correlation predicates and wherein said update execution strategy comprises the step of assigning a value to the corresponding attribute in the element base view.

25 10. The method of claim 4, wherein said update is a deletion of a referenced peninsula (RP) root-node that is permitted only when a foreign key of the parent node does not appear in the view as a leaf node and wherein said update execution strategy comprises the step of setting the foreign-key values in the element base view of its direct
30 parent to NULL.

11. The method of claim 4, wherein said update is an insertion of an RP-root-node that is permitted only when a foreign key of the parent node does not appear in the view as a leaf node; overlap island (OI)-descendants of the inserted node, as given in the insertion, include exactly those descendant nodes that can be derived from existing tuples
5 in the database that satisfy the correlation predicate(s); and each branch node in the inserted subtree has a leaf child corresponding to the key of the element base view; and wherein said update execution strategy comprises the steps of setting the foreign-key values in the element base view of its direct parent to the key values in its element base view; inserting the corresponding tuple into the element base view if the inserted node
10 contains new values; and propagating the insertion to its branch RP-descendants that contain new values.

12. A system for determining if an update to an XML document can be reflected in an underlying relational database, wherein said XML document is comprised
15 of a tree of nodes, comprising:

a memory; and

at least one processor, coupled to the memory, operative to:

assign at least one of a plurality of categories to each of said nodes, wherein said plurality of categories are based on a cardinality relationship indicated by
20 one or more correlation predicates and one or more foreign key constraints in said underlying relational database; and

determine whether said update to said XML document can be reflected in said underlying relational database based on said assigning category.

25 13. The system of claim 12, wherein said plurality of categories includes overlap island, dependency continent and referenced peninsula categories.

14. The system of claim 12, wherein said plurality of categories includes
30 transitive archipelago and pseudo transitive archipelago categories.

15. The system of claim 12, wherein said processor is further configured to determine an update execution strategy based on said assigning category.

16. An article of manufacture for determining if an update to an XML document can be reflected in an underlying relational database, wherein said XML document is comprised of a tree of nodes, comprising a machine readable medium containing one or more programs which when executed implement the steps of:

assigning at least one of a plurality of categories to each of said nodes, wherein said plurality of categories are based on a cardinality relationship indicated by one or more correlation predicates and one or more foreign key constraints in said underlying relational database; and

determining whether said update to said XML document can be reflected in said underlying relational database based on said assigning category.

17. The article of manufacture of claim 16, wherein said plurality of categories includes overlap island, dependency continent and referenced peninsula categories.

18. The article of manufacture of claim 16, wherein said plurality of categories includes transitive archipelago and pseudo transitive archipelago categories.

19. The article of manufacture of claim 16, wherein said processor is further configured to determine an update execution strategy based on said assigning category.